What is claimed is:

1. A method of reducing jitter in a shared-media packet-switched access network offering integrated Internet Protocol voice and data services comprising the steps of:

transmitting packets in an upstream channel in a frame,

and

establishing at least two non-overlapping jitter windows in said frame for carrying voice packets.

2. The method of claim 1 further comprising the step of:

dividing said frame into a sequence of one or more voice regions and one or more data-only regions, and

establishing said at least two non-overlapping jitter windows in said one or more voice regions.

3. The method of claim 2 wherein said step of establishing at least two non-overlapping jitter windows in said one or more voice regions further includes:

establishing two jitter windows,

where *n* is the number of time slots in said one or more voice regions, defining the length of each of said two non-overlapping jitter windows as *n*/2 for an even number of time slots in the voice region, or

for an odd number of time slots in said one or more voice regions, defining the length of one non-overlapping jitter window as $(n-1)/2$, and the length of the other jitter window as $(n+1)/2$.

4. The method of claim 1 wherein said shared-media packet-switched access network is connected to a distribution plant comprising one of hybrid fiber-coaxial, coaxial, or fiber-to-the-curb.

5. The method of claim 2 wherein said jitter windows are established in one voice region.

6. The method of claim 2 wherein said jitter windows are established in two voice regions separated by a data-only region.

7. The method of claim 1 wherein said step of establishing at least two non-overlapping jitter windows further includes:

establishing more than two non-overlapping jitter windows.

8. The method of claim 7 wherein the lengths of each of said more than two non-overlapping jitter windows are approximately equal.

9. A method of allocating upstream channel bandwidth in a shared-media packet-switched access network offering integrated Internet Protocol voice and data services comprising the steps of:

selecting an upstream channel with at least one idle time slot to accommodate a new voice connection and one or more existing voice connections,

assigning time slots in said upstream channel to carry voice packets generated from said new and existing voice connections, voice packets generated from said one or more existing voice connections, and previously assigned to one jitter window, being maintained in the same jitter window in the selected upstream channel.

10. The method of claim 9 wherein said step of selecting an upstream channel further includes selecting an upstream channel, and

(1) the number of idle time slots in each jitter window in said selected upstream channel being no less than the number of idle time slots allocated to a corresponding jitter window in a current channel accommodating existing voice connections, and

(2) at least one of the jitter windows in said selected channel accommodating voice packets from said new and existing voice connections.

11. The method of claim 9 wherein said step of selecting an upstream channel further includes selecting one of a packed with first fit, minimally packed or maximally spread upstream channel.

12. The method of claim 9 wherein said step of assigning time slots further includes assigning an idle time slot for said new voice connection by selecting one of a lowest idle time slot, a highest idle time slot or randomly selecting an idle time slot.

13. The method of claim 9 wherein said voice connections are constant-bit-rate voice connections.

14. A method of allocating upstream channel bandwidth in a shared-media packet-switched access network offering integrated Internet Protocol voice and data services comprising the steps of:

assigning an upstream channel for transmitting voice packets generated from a new voice connection on a call-by-call basis.

15. The method of claim 14 further comprising the step of:

assigning time slots in said upstream channel to carry said voice packets.

16. The method of claim 14 further comprising the step of:

selecting an upstream channel using one of packed with first fit, minimally packed or maximally spread techniques to select said upstream channel.

17. The method of claim 15 wherein said step of assigning time slots further includes assigning an idle time slot for said new voice connection by selecting one of a lowest idle time slot, a highest idle time slot or randomly selecting an idle time slot.

18. A shared-media packet-switched access network offering integrated Internet Protocol voice and data services comprising:

a cable modem located at a customer-end of an access network;

a cable modem termination system located at a head-end of an access network;

at least one upstream channel for transmitting voice and data packets from said cable modem to said cable modem termination system; wherein

said packets are transmitted in a frame, wherein said frame comprises at least two non-overlapping jitter windows for carrying said voice packets.

19. The network of claim 18, wherein said frame includes one or more voice regions, and said at least two jitter windows are included in said one or more voice regions.

20. The network of claim 18, wherein said frame comprises two non-overlapping jitter windows in two voice regions, n being the number of time slots in the voice region, defining the length of each of said two non-overlapping jitter windows as $n/2$ for an even number of time slots in the voice region, or

for an odd number of time slots in the voice region, defining the length of one non-overlapping jitter window as $(n-1)/2$, and the length of the other jitter window as $(n+1)/2$.

21. The network of claim 18, wherein said cable modem termination system assigns said at least one upstream channel to said cable modem by selecting one of one of a packed with first fit, minimally packed or maximally spread upstream channel.

22. The network of claim 18, wherein said cable modem termination system selects one of a lowest idle time slot, a highest idle time slot or randomly selecting an idle time slot to carry said voice packets.

23. The network of claim 18, wherein said cable modem termination system assigns a new upstream channel, with at least one idle time slot, to said cable modem when said at least one upstream channel cannot accommodate a new voice connection from said cable modem.

24. The network of claim 23, wherein said cable modem termination system selects said new upstream channel based on the following:

(1) the number of idle time slots in each jitter window in said new upstream channel being no less than the number of idle time slots allocated to a corresponding jitter window in a current channel accommodating existing voice connections, and

(2) at least one of the jitter windows in said new upstream channel can accommodate voice packets from said new and existing voice connections.

25. The network of claim 18, wherein said access network includes one of hybrid fiber coaxial, coaxial or fiber-to-the-curb.

26. The network of claim 19, wherein said at least two non-overlapping jitter windows includes more than two non-overlapping jitter windows.

27. The network of claim 26, wherein the lengths of each of said more than two non-overlapping jitter windows are approximately equal.

28. A shared-media packet-switched access network offering integrated Internet Protocol voice and data services comprising:

at least one upstream channel for transmitting voice and data packets to said cable modem termination system; wherein

said packets are transmitted in frames, and each of said frames comprises two non-overlapping jitter windows for carrying voice packets.

29. A method of allocating upstream channel bandwidth in a shared-media packet-switched access network offering integrated Internet Protocol voice and data services comprising the steps of:

selecting a maximally spread upstream channel for transmitting voice packets generated from a new voice connection, and

assigning a random idle time slot in the selected maximally spread upstream channel to carry said voice packets.

30. The method of claim 29 further comprising the step of:

searching for said maximally spread channel by searching upward from a first upstream channel when said new voice connection is the first established voice connection.

31. The method of claim 30 wherein said step of searching for said maximally spread channel further includes searching downward from the last upstream channel when said new voice connection is not the first established voice connection.

32. A method of assigning a cable modem requesting bandwidth to accommodate a new call, wherein said cable modem requesting bandwidth is assigned to a current upstream channel and has at least one existing call, to an upstream channel to accommodate said new and said at least one existing call comprising:

searching for a cable modem assigned to said current channel with the least number of calls,

assigning a new upstream channel to a cable modem with the least number of calls.

33. The method of claim 32 further comprising:

determining whether the cable modem with the least number of calls is said cable modem requesting bandwidth.

34. The method of claim 33 further comprising:

moving said cable modem with the least number of calls to said new upstream channel, if said cable modem with the least number of calls is not said cable modem requesting bandwidth.

35. The method of claim 33 further comprising:

randomly selecting a cable modem with the least number of calls if more than one cable modem assigned to said current channel has the least number of calls and said cable modem requesting bandwidth does not have the least number of calls.